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p. 43, 5th line from bottom,	*for*	21st August	*read*	19th August.
43, 4th	,,	19th August	,,	21st August.
194, 8th	,,	$\ast - 2' \; 48''\cdot 1$	,,	$\ast + 2' \; 48''\cdot 1$.
195, 9th line from top,		$\Delta\lambda = -90''\cdot 4$	,,	$\Delta\lambda = -90''\cdot 0$.
258, 14th	,,	Feb. $22^d \; 7^h \; 55^m \; 9^s$	,,	Feb. $22^d \; 8^h \; 15^m \; 9^s$.

Windsor, New South Wales,
October 22*nd*, 1866.

On the Correction of the Secondary Spectrum of Object-Glasses.
By W. Wray, Esq.

Having been engaged for many years in experiments relating to the residual spectra of refractors, I beg leave to say a few words on the subject, and to announce that I have completely succeeded in removing all trace of chromatic aberration from object-glasses, upon a system extremely simple, and by no means expensive. The results which have been well, and for a long time tested, appear to warrant me, at once, to make the matter known to the Members of the Society. It is not my intention, at present, to occupy an undue share of attention, nor to enter into many details; these I would reserve for a more extensive paper, if the matter possess sufficient interest.

The subject of the irrationality of spectra is one which has engaged my investigation since 1855. It occurred to me in that year, after an examination of the quantities of residual colour given by first-class object-glasses, that there might be found such a difference of irrationality between two independent sets of glasses, as to allow of a compensation by opposite effects. In this expectation I was, however, disappointed, for I found that within the range of materials to be readily obtained in practice, the difference of irrationality between any given two pairs was comparatively inconsiderable. One thing, however, I learnt by this, what appears as a large residue of secondary colour in many fine refractors, is not really so, but a mixture of *primary* and *secondary;* consequently, the results, as obtained from two object-glasses of the same aperture, focus, and power, by different makers, and made from different materials, are often vitiated by their not being in a fair condition for rigorous comparison.

Having, however, subsequently freed such glasses from all trace of *primary* chromatic aberration, I found, as is well known, that the higher the dispersive ratio the greater the residual spectrum; but the comparative difference in even

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extreme cases was, as I have just remarked, considerably less than what I had been led to expect. Still there was a difference, and that difference would lead one, so far as the construction of the ordinary object-glass is concerned, to condemn the use of high dispersive ratios, such as exist between crown and heavy flint glasses.

In working out this matter, I have tried a very great number of different kinds of glass,—both flint and crown,—flint glasses more particularly, formed from various metallic oxides and with densities ranging from 2·833 to the density 5·49 of Dr. Faraday's boro-silicate of lead; my object being to form a triple or quadruple combination, in which one of the *convexes* should have a very high dispersive power, and correct the irrationality of the other lenses. I regret, however, to say, that by glasses alone the subject remains to me still nearly hopeless; for the difference of irrationality between any given crown and the flint of density 2·833, and between the same crown and Dr. Faraday's glass, is not sufficient to allow of a destruction of the secondary spectrum, with anything like a reasonably shallow system of curves, even where four lenses are combined.

By means, however, of a judicious selection of flint and crown glass, and an extremely thin meniscus film of highly dispersive cement, there is no difficulty whatever, not only in completely destroying the irrationality, but even in inverting the spectrum at pleasure, the green light being, in the latter case, seen bounding the outer diffraction ring, *inside* focus.

Having made several glasses of from 4 to 7 inches aperture upon this plan, I can speak with confidence as to its success. Under very high powers I get a perfectly achromatic image of the Moon and planets, which are shown in a surprisingly sharp and clean manner on the black ground of the sky, reminding one of a first-class reflector, under its very best behaviour.

The intense blackness of the lunar shadows, under high powers, and the peculiar and variegated tints seen on the surface of the Moon are finely brought out; but, perhaps, the best comparison between the presence and absence of the secondary spectrum is made on *Jupiter*, as I have done with two glasses, each of 4 inches aperture, and nearly the same focus,—one, very fine, on the old plan,—the other perfectly achromatised. With a power of 200 or 250 the absence of chromatic confusion in the latter telescope had a striking effect on the definition of the belts and markings, and showed an image much more brilliant and pleasing than was given by the other glass. These glasses are now in the possession of E. C. Tufnel, Esq., Fellow of the Society.

For spectrometric analysis, I apprehend that the perfect achromatism of this arrangement may be found of some service. The Astronomer Royal having kindly undertaken to examine a large object-glass for me, I may conclude this notice by saying

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that a 7-inch clear aperture of 8½-feet focus, just finished, promises fairly to substantiate what I have represented.

1 Clifton Villas, Highgate Hill, N.,
12 *Dec.* 1866.

On the Telescopic Disks of Stars. By G. Knott, Esq.

At the Meetings of the Society in June and December last year the question of the relation between the size of the telescopic disks of stars and the aperture of the telescope attracted some little attention, and it was suggested as desirable that attempts should be made to measure the diameter of the spurious disk, or, in preference, that of the brighter part of the first ring.

Being in possession of a spherical crystal micrometer, which was mentioned by Mr. Dawes as well adapted for the purpose, I have, on several evenings during the past few months, employed it in the measurement of star disks; and although I have not yet succeeded in measuring the diameter of the first ring, I venture to bring the results I have obtained before the notice of the Society, in the hope that they may not be quite without interest.

The micrometer, which was formerly in the possession of Mr. Dawes, differs from that described by Dr. Pearson, in having no field lens; the whole of the magnifying power is, consequently, given by the sphere, and is invariable. The sphere has a diameter of rather more than four-tenths of an inch, and on my Alvan Clark refractor of 7⅓ inches aperture and 110·6 inches focal length gives a magnifying power of 368. The aperture of the telescope was varied by cardboard diaphragms placed in front of the object-glass. I have for convenience arranged my results in a tabular form, and need only say in explanation that, with the single exception of the 2-inch measures of *α Coronæ Borealis*, the result in each case is the mean of six measures, which were generally fairly accordant.

Table of Observations

Date of Obs.	Star Observed.	Diameter of Disk, as measured with various Apertures.					
		7^{in}·33	6^{in}·00	4^{in}·95	4^{in}·00	3^{in}·00	2^{in}·00
		″	″	″	″	″	″
July 10	α Coronæ Bor.	0·833	..	1·172	..	1·748	2·324
Oct. 22	α Tauri	..	0·846	1·047	1·398	1·772	2·608
	Polaris	..	0·929	1·130	1·395	1·729	2·378
	α Orionis	..	0·852	1·214	1·683	2·162	2·932
Nov. 6	β Cygni A	..	0·995	..	1·414	1·865	..
	β Cygni B	..	0·691	..	1·051	1·425	..
	Polaris	..	0·919	1·246	1·542	1·802	2·480